



# Financial inclusion through CBDC: Opportunities and challenges in emerging markets with special reference to India

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**Abstract:** Central Bank Digital Currency (CBDC) is a digital form of sovereign money issued by a central bank to serve as legal tender alongside cash. CBDCs are viewed in many emerging and developing economies as a way to expand financial inclusion by lowering transaction costs, easing access to digital payments, and providing a safe, public alternative to cash and privately issued e-money. India has introduced retail and wholesale pilots of the digital rupee (e₹), guided by a detailed concept note and phased testing strategy by the Reserve Bank of India. This review paper examines how CBDC could support financial inclusion in emerging markets, with an emphasis on India. It synthesises international evidence and Indian studies on possible inclusion channels—such as offline use, simplified wallets, and better targeting of government transfers—as well as key risks related to digital divide, literacy, privacy, cybersecurity, and bank funding. It is concluded that CBDC can be a useful complementary tool for inclusion if it is carefully designed, integrated with wider digital public infrastructure, and supported by strong consumer protection and education measures.

**Keywords** - Central Bank Digital Currency (CBDC), Financial inclusion, Digital rupee (e₹), Digital public infrastructure (UPI, Aadhaar, Jan Dhan), Programmable payments and G2P transfers.

## I. INTRODUCTION

Financial inclusion is now a central policy priority in many emerging markets because access to affordable and appropriate financial services supports growth, poverty reduction, and resilience (World Bank, 2022c). The Global Findex data show that, despite progress, large sections of adults—especially women, rural residents, and informal workers—either remain unbanked or do not actively use formal accounts (World Bank, 2022c). In this context, CBDC has attracted attention as a possible way to extend safe digital payments and basic services to those excluded from the traditional banking system (BIS, 2021; IMF, 2021).

India presents a particularly relevant case. On one hand, rapid growth in digital payments has been driven by digital public infrastructure such as Aadhaar, Jan Dhan accounts, and the Unified Payments Interface (UPI) (NITI Aayog, 2021; Prajapati & Kumar, 2025). On the other hand, usage gaps remain, and cash continues to dominate in many rural and low-income settings (Ministry of Finance, 2023; Sharma & Gupta, 2020, as cited in Parihar & Gujar, 2025). From 2022 onwards, the RBI has explicitly linked its launch of retail and wholesale e₹ pilots to objectives such as financial inclusion, payment efficiency, and innovation (RBI, 2022a, 2023, 2025). This paper reviews global and Indian evidence to assess how CBDC can help close inclusion gaps and what conditions are needed for success in emerging markets.

## II. CBDC AND FINANCIAL INCLUSION: GLOBAL PERSPECTIVES

Survey work by the BIS shows that central banks in emerging market and developing economies often rank financial inclusion as a leading motivation for CBDC exploration, alongside reducing cash handling costs and improving payment resilience (BIS, 2021, 2022). BIS (2022) argues that CBDC could support inclusion by enabling low-value accounts with simplified customer checks, reducing merchant fees, and allowing access through non-bank intermediaries and basic devices.

IMF studies model the macro-financial impact of CBDC and find that, under certain conditions, wider access to central bank money can bring unbanked users into the formal system, increase transaction efficiency, and even expand credit if the banking sector adapts appropriately (IMF, 2021; Tan, 2023). At the same time, it is warned in these studies that fundamental barriers such as low income, weak connectivity, limited identification, and distrust in institutions cannot be overcome by technology alone (IMF, 2021; Tan, 2023; World Bank, 2022a). World Bank (2022a, 2022b) stresses that CBDC should be seen as one more instrument in a broader financial inclusion strategy that also covers digital infrastructure, consumer protection, competition, and financial capability.

### III. INDIA'S CBDC DESIGN AND POLICY OBJECTIVES

The RBI defines CBDC as legal tender issued in digital form by the central bank and intended to be freely convertible with cash and commercial bank money (RBI, 2022a). Multiple objectives are identified in its concept note: reducing currency management costs, supporting financial inclusion, encouraging innovation in payments, strengthening cross-border transfers, and enhancing the resilience and efficiency of the payment system (RBI, 2022a; KPMG in India, 2022). The note favours a two-tier structure in which the RBI issues CBDC while banks and other licensed entities distribute it to the public (RBI, 2022a; BIS, 2022).

For inclusion, RBI (2022a) emphasises the need for simple, low-cost wallets; small-value tiers with proportionate know-your-customer (KYC) norms; and offline functionality for areas with limited connectivity. Interoperability with existing systems, such as UPI, is also emphasized to avoid fragmentation and user confusion (RBI, 2022a; Prajapati & Kumar, 2025). Press releases and annual reports show that pilots have been rolled out in phases, with a growing number of banks, users, and merchants, and experiments with offline and programmable use cases, including targeted transfers (RBI, 2023, 2025; Cointelegraph, 2025, as summarised in Madhok & Bizama, 2025). This cautious approach reflects an intention to balance innovation with financial stability and operational risk management.

### IV. OPPORTUNITIES FOR FINANCIAL INCLUSION IN INDIA AND OTHER EMERGING MARKETS

Several channels through which CBDC can support inclusion in India and similar economies emerge from recent research. It is argued by Banerjee and Sinha (2023) that a well-designed retail CBDC, integrated with the existing payment ecosystem, can make low-value digital payments cheaper and more accessible, especially for small merchants and low-income users. Parihar and Gujar (2025) find that awareness of the digital rupee is already relatively high among surveyed respondents, and that many see potential benefits for secure, low-cost transactions and reduced dependence on cash.

CBDC can also strengthen government-to-person (G2P) transfers. BIS (2021) and the World Bank (2022a) note that programmable features and instant settlement can make social benefits, subsidies, and pensions faster, more transparent, and easier to audit. In the Indian context, Gupta and Singh (2023) and KPMG in India (2022) suggest that routing such transfers through CBDC wallets could reduce leakages and help recipients—especially in rural and low-income segments—build a history of formal transactions. Basic credit scoring for thin-file customers could be supported by this transaction data, if used with consent and proper safeguards (Tan, 2023).

Offline functionality is another inclusion opportunity. BIS (2022) highlights that offline CBDC can serve users in remote or disaster-affected areas and reduce dependence on mobile data networks. RBI (2022a) and Prajapati and Kumar (2025) see particular value in offline or low-tech CBDC access for India's rural and semi-urban areas, where internet coverage and reliability remain uneven. It is further pointed out by Prodevans (2025) and Madhok and Bizama (2025) that CBDC could empower women and marginalised groups by offering a simple, state-backed digital instrument that may be more trusted than some private wallets.

For emerging markets more broadly, CBDC can act as a public digital payment rail that supports competition and resilience, rather than leaving the ecosystem dominated by a few large private providers (BIS, 2021; World Bank, 2022b). When combined with digital identity and inclusive KYC frameworks, CBDC can lower onboarding barriers while still meeting regulatory standards (IMF, 2021; NITI Aayog, 2021).

### V. CHALLENGES AND RISKS FOR INCLUSIVE CBDC ADOPTION

Despite these opportunities, significant challenges remain. First, substantial digital divides in devices, connectivity, and skills persist across regions and income groups in India and many emerging markets (Ministry of Finance, 2023; NITI Aayog, 2021). Parihar and Gujar (2025) show that while 72 percent of their respondents had heard of CBDC, only 14.67 percent had a strong understanding of its features, with limited digital literacy and smartphone dependence highlighted as key barriers. Gupta and Singh (2023) and Prodevans (2025) report similar concerns about low awareness, fear of cybercrime, and confusion between CBDC and existing digital payment tools.

Second, there are concerns about possible effects on bank intermediation. Scenarios are modelled by IMF (2021) and Tan (2023) in which large shifts from bank deposits into CBDC, especially during stress periods, could raise banks' funding costs and reduce credit supply. BIS (2021) also warns that, without safeguards, CBDC might amplify bank runs. This is recognised in the RBI (2022a) concept note, which also proposes features such as non-interest-bearing CBDC and holding limits to reduce incentives to move large balances out of bank accounts.

Third, privacy, data protection and cybersecurity pose serious policy questions. BIS (2022) and IMF (2021) highlight that CBDC infrastructure will generate detailed transaction data, which could be misused if governance is weak. RBI (2022a) proposes "managed anonymity" for small-value transactions, but stakeholder concerns remain about surveillance, data breaches, and potential misuse, as also noted by FTI Consulting (2025) and Parihar and Gujar (2025). Policymakers therefore need to ensure robust legal frameworks, clear accountability, and strong technical safeguards (BIS, 2021; World Bank, 2022b).

Finally, the presence of an already successful system like UPI changes the adoption dynamics. NITI Aayog (2021) and Prajapati and Kumar (2025) show that UPI has transformed retail payments and driven inclusion gains, setting a high benchmark for user experience. FTI Consulting (2025) and Madhok and Bizama (2025) argue that CBDC must find a distinct role—as a digital

alternative to cash and a rail for specific use cases—rather than competing directly with UPI. If the differences between the two are poorly communicated, users could become confused and adoption could slow.

## VI. POLICY IMPLICATIONS AND WAY FORWARD

Evidence from global studies and early Indian research suggests that CBDC should be embedded in a broader strategy for financial inclusion and digital public infrastructure, not treated as a standalone technology project (BIS, 2022; IMF, 2021; World Bank, 2022a). For India and similar emerging markets, close coordination is called for among the central bank, government, financial regulators, and private providers to ensure that CBDC complements rather than disrupts existing systems like UPI (KPMG in India, 2022; Prajapati & Kumar, 2025).

Design choices need to prioritise inclusive features: simple interfaces in local languages, low-cost wallets, small-value tiers with proportionate KYC, offline or low-tech channels, and full interoperability with other payment rails (Banerjee & Sinha, 2023; RBI, 2022a; World Bank, 2022b). Parallel investments in connectivity, cybersecurity, grievance redressal, and financial education are regarded as crucial, especially for women, rural populations, and micro-enterprises (Madhok & Bizama, 2025; Ministry of Finance, 2023; World Bank, 2022c). Continuous monitoring through pilots, user surveys, and impact evaluations, such as those undertaken by Parihar and Gujar (2025), can help refine design and mitigate unintended effects on stability and competition.

## VII. CONCLUSION

CBDC has significant potential to support financial inclusion in emerging markets by offering a safe, widely accepted form of digital public money that can reach currently excluded or under-served groups (BIS, 2021; IMF, 2021; World Bank, 2022a). In India, a valuable opportunity is provided by the digital rupee pilots to test how design features such as offline use, simple wallets and integration with UPI can help low-income and rural users adopt digital payments and receive welfare transfers more effectively (Banerjee & Sinha, 2023; KPMG in India, 2022; RBI, 2023). However, the experience of early studies also shows that CBDC alone cannot overcome deep-rooted barriers linked to income, infrastructure, capability and trust, and may introduce new risks if not carefully managed (FTI Consulting, 2025; Parihar & Gujar, 2025; Tan, 2023). Policymakers will therefore need to adopt a cautious, phased and inclusive approach—grounded in strong institutions, consumer protection and continuous learning—if CBDC is to become a genuine tool for financial inclusion in India and other emerging markets.

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